



Harrington Engineering & Construction, Inc.

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October 30, 2007

Kevin Adler  
USEPA Region 5  
77 West Jackson Boulevard  
Mail Code: SR-6J  
Chicago, IL 60604-3507

Erin Rednour, Project Manager  
Illinois Environmental Protection Agency  
Bureau of Land  
1021 North Grand Avenue East  
P.O. Box 19276  
Springfield, Illinois 62794-9276

**Re: Response to Comments  
90% Design – Slip 3 Containment Alterations  
OMC Superfund Site, Waukegan, Illinois**

Dear Mr. Adler and Ms. Rednour:

On behalf of the City of Waukegan, Harrington Engineering & Construction, LLC (HE&C) provides the following responses to the comments prepared by United States Environmental Protection Agency (USEPA) and Illinois Environmental Protection Agency (IEPA) on August 6, 2007, and August 24, 2007, respectively. The USEPA comments prepared by CH2M HILL contain two general comments and nine specific comments on the 90% Design drawings prepared by HE&C. IEPA's letter commented on the appropriate handling of soil below the surcharge sand in the Slip 3 containment. For convenience, the comments from the documents are repeated *in italics* below. A response to each of the points is provided following the text in italics.

**CH2MM Memorandum - General Comments**

- 1. The basic concepts presented in the drawings appear to be reasonable, assuming that the characterization of the contamination provided in the TM is accurate. We have very few comments on the submittal; most relate to the need to provide details such that the new 60-mil HDPE lining – together with the other structural elements such as the grade beams – will provide a continuous primary containment barrier. Specifically, the drawings provide no detail regarding attachment of the HDPE lining to the various penetrations under the building (e.g., monitoring well, piling, etc.). It is unclear how the HDPE lining will act as a continuous primary containment without such connections.*

In the area under the proposed building, the HDPE liner will fulfill a secondary containment barrier function. The primary system to keep rainwater from penetrating into the containment will be the concrete floor slab and the roof of the proposed building. The function of the liner under the building slab will be as a primary barrier for emission of vapor from within the cell into the building and as a secondary barrier to rainwater or other sources of surface water. As presented in the Basis of Design Memorandum, Alteration of Slip No. 3 Containment Cell, Outboard Marine Corporation Superfund Site, dated November 20, 2006, the grade under the building will not slope towards the edges of the containment and the presence of the building and its floor slab with drain system is the primary means of controlling surface water.

Responses to comments about individual penetrations are provided below. In general, any penetration of the liner by a circular object will be as shown in detail 17 on Sheet 13 of the Drawings. The title of this detail is changed to General Detail of Liner Penetration – Circular Penetrations.

2. *The concept presented in the "Basis of Design Memorandum, Alteration of Slip No. 3 Containment Cell, Outboard Marine Corporation Superfund Site" dated November 20, 2006 discussed roof downspout drains. In a comment on that document, it was asked if the downspout drains would be able to reach the peripheral drainage system with adequate cover and still not extend into the contaminated sediments. The present drawings do not address roof drainage. How will it be managed to prevent infiltration into the containment cell?*

The building design has not progressed to the point of detailing the location of gutter downspouts. However, all gutter downspouts will angle away from the building and discharge onto the ground or directly into the existing perimeter storm sewer running under the swale on the south and north sides of the containment. On the North end of the building, the discharge points will be onto asphalt that will be pitched toward the series of existing catch basins on the Larsen Marine property that ultimately discharge to the Harbor or discharged through a buried pipe above the liner that discharges into a catch basin below grade. On the south side of the building, downspouts will discharge into the existing drainage swale that conveys water into the Harbor or directly into the catch basin through a subsurface drain that is installed above the liner. The gable ends of the building will have no downspouts. A note has been added to Sheet 7 of 13 requiring that downspout drains be installed no more than eighteen inches below grade and only under the supervision of the City of Waukegan.

#### **CH2MM Memorandum - Specific Comments**

1. **Sheet 4. Note 11.** *This states that the topsoil and sand will be stockpiled at the City of Waukegan property location on Sheet 1. There is no proposed location identified on Sheet 1.*

Sheet 1 is revised to show the stockpile location on the City property.

2. **Sheet 8.**

- a. *The area under the building is shaded and noted to be the "60-MIL HDPE LINER." Presumably the remainder of the area enclosed within the slurry walls and the east sheet pile wall will also be provided with a 60-mil HDPE lining; the details on Sheet 13 imply this. This should be clarified.*
- b. *Is there any slope the HDPE liner under the building? Where will drainage from the geocomposite drainage layer be discharged?*

The 60-mil HDPE liner is continuous outside of the building footprint within the area enclosed by the slurry wall. The shading note is changed to indicate that the liner under the building is a separate liner fastened to the inside of the grade beam for the building and is placed at elevation 582.2 feet with no sloping grade.

There is no slope to the HDPE liner under the building and there is no location for the geocomposite drainage layer to discharge because of the grade beam. The HDPE liner is not acting as the primary containment element to prevent the influx of surface water into the containment.

3. **Sheet 10. Detail 3. Note 6.** *This states that the HDPE liner under the interior floor slab is not welded to the grade beam. It should be to provide a continuous primary lining.*

Note 6 will be revised to state that the liner shall be welded to the grade beam using a Polylock imbed on the inside of the grade beam with the detail as shown in the Polylock detail (Detail 15 on Sheet 13). This will allow the liner to perform its function as a secondary containment barrier to water intrusion and to act as a barrier to vapor from inside the containment.

4. **Sheet 11. Detail 7.** *The lowered Well Vault (R-1) is not called out on Sheet 6. Should this be Detail 8 (on Sheet 7)? In addition, the liner to well vault penetration detail (Detail 17 on Sheet 13) should be called out to show how the HDPE will be connected to the vault to provide a continuous primary lining.*

Sheet 6 of 13 shows only the building and does not include the area of lowered Well Vault (R-1). The location of R-1 is shown on Sheet 7 of 13 and Detail 7 on Sheet 11 should be labeled as Detail 8 and is changed. A note for this detail is also added to refer to the liner penetration detail 17/13 as the means of attaching the liner to the well vaults at both R-1 and R-2.

5. **Sheet 11. Detail 9.** *How is the HDPE connected to the steel casing to provide a continuous primary lining?*

Detail 9 is revised to show the HDPE liner connected to the well vault body at elevation 582.2 feet. A note is also added to indicate that the annulus between the steel casing and the base of the R-1 and R-2 well vault will be sealed with the volclay waterstop specified on Sheet 10 of 13. There will not be a connection of the HDPE liner with the steel casing of the recovery well.

6. **Sheet 11. Detail 10.** *It is not clear where this detail applies. If within the building, how is the HDPE connected to the concrete to provide a continuous primary lining?*

This detail applies to the monitoring wells located within the slurry wall footprint that are shown on Sheet 2 (none are located within the building footprint). A note is added to Sheet 2 to indicate revision from above grade covers to the detail 10 of Sheet 11 detail. Continuous primary lining will attach to the riser pipe as shown in Detail 17. A note is added to Sheet 11 to clarify liner attachment where liner is present (The "W" wells are outside of the slurry wall and will not need to have the liner attached to the well casing).

**7. Sheet 12. Detail 13.**

- a. *Special care will have to be taken to protect the HDPE liner from potential puncture damage where it crosses the slurry wall; the specifications should discuss removal of rocks or other objects as needed to protect the liner here.*
- b. *In Section B, provide a boot-type penetration for both conduits (or some other method to provide a continuous primary lining).*
- c. *In Section A and the plan view, the specifications should discuss how the 12-inch-diameter steel pipe is placed to minimize the potential for void formation in the slurry wall backfill. The seep collar is a good idea; the specifications should call for careful tamping of the backfill around the collar and beneath the pipe.*

Notes concerning puncture protection are added to Sheet 8 – Top of Liner.

All penetrations of the liner will be as shown in Detail 17. The title of that detail will be changed to reflect the intent that it should apply to all penetrations and a note referencing the detail is added to Section B on Sheet 12 of 13.

Installation notes requiring that the backfill be replaced with soil bentonite mixture containing at least 10% bentonite by weight is added to the steel pipe Detail 13.

- 8. Sheet 13. Detail 15.** *The use of the Polylock strip is a convenient method to connect to the concrete, but has limited structural strength. Provision should be made to provide some amount of slack in the liner, or to otherwise accommodate potential differential settlement between the soil and the grade beam. The grade beams are pile-supported and therefore unlikely to settle very much, while the fill is not pile-supported and may settle differentially relative to the grade beams.*

Detail 15 is revised to show slack in the liner as is shown on detail 17.

- 9. Sheet 13. Detail C.** *HDPE is the least puncture-resistant of the commonly used geomembranes. A method to protect the HDPE liner from puncture where it is located above the protective concrete panels should be provided.*

The detail of the HDPE liner across the concrete panels is based upon the configuration currently in place at the site, which has been successful at preventing ingress of groundwater into the containment cell. Additional puncture protection at these locations is not considered necessary beyond the general requirements to insure that stones and other items that may puncture the new liner be removed prior to installing the liner. A note requiring that the top of the concrete panels be swept and the surface approved prior to installing the liner over the panel is added to insure that this detail will be inspected prior to liner installation.

#### IEPA Letter

- 1. Slip 3 was constructed to provide a containment cell for TSCA level contaminated dredge sediment from the harbor in excess of 50 ppm and up to 500 ppm PCB. Therefore, the contaminated material below the surcharge sand should be handled, including proper worker PPE and exposure precautions, and disposed of in accordance with TSCA 40 CFR 761.*

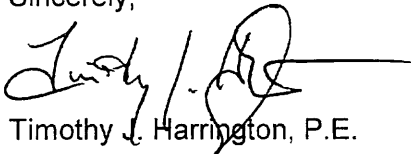
While significant excavation into the PCB-contaminated sediment is not anticipated, a note is added to Sheet 4 stating that materials excavated from below elevation 581.0 will be considered TSCA material and must be handled, transported, and disposed of at a TSCA-approved landfill, in accordance with TSCA 40 CFR 761.

A copy of the 100% design drawings incorporating the responses to the above comments and some changes on the electrical and mechanical items made by HE&C to complete the drawings to issue for construction are include for your use as you review the response to comments.

The design work is complete and we await the approval of USEPA and IEPA so that we may schedule the alteration work for the 2008 construction season.

If you have any questions or require additional information during your review process, please do not hesitate to contact me or John Moore at (847)-625-6858.

Sincerely,



Timothy J. Harrington, P.E.

Cc: John Moore, P.E., City Engineer, City of Waukegan  
Ken Larsen, Larsen Marine

# CITY OF WAUKEGAN

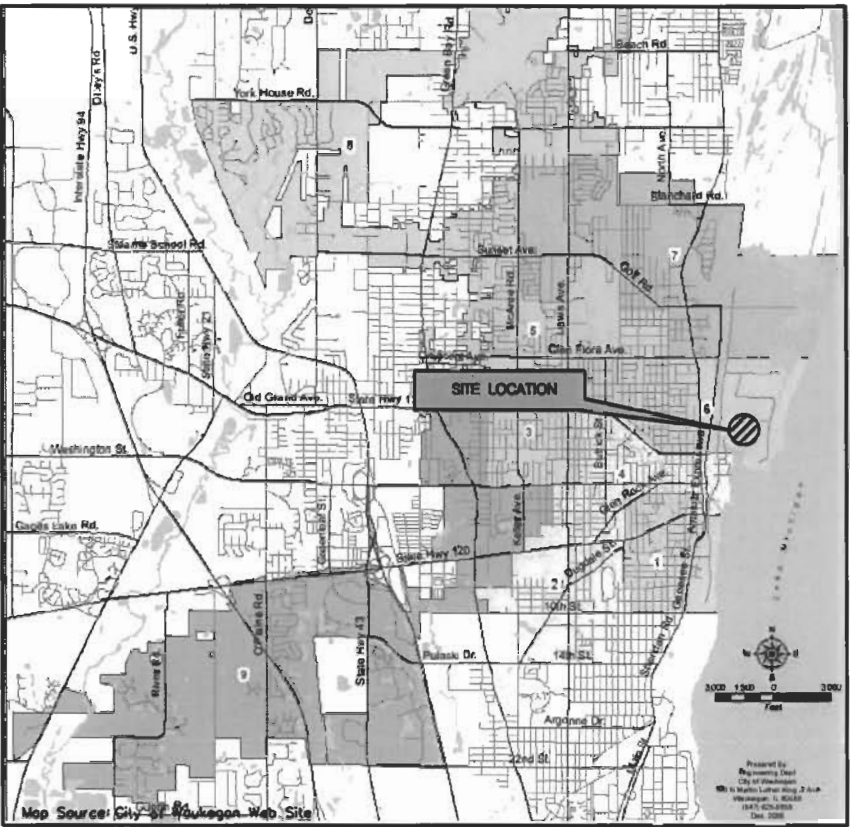
## CONTAINMENT ALTERATION / BOAT STORAGE RE-USE

### WAUKEGAN HARBOR SLIP 3 SITE

100% DESIGN SUBMITTAL  
OCTOBER 2007



PROJECT AERIAL MAP



SITE LOCATION MAP

#### DRAWING INDEX

- 1 COVER SHEET
- 2 EXISTING CONDITIONS PLAN
- 3 EXISTING CONDITIONS CROSS SECTIONS
- 4 EXCAVATION PLAN
- 5 EXCAVATION CROSS SECTIONS
- 6 FOUNDATIONS/SLAB PLAN AND H-PILE LOCATIONS
- 7 MECHANICAL AND ELECTRICAL PLAN
- 8 TOP OF LINER PLAN
- 9 FINISHED SURFACE PLAN
- 10 DETAILS 1 to 7
- 11 DETAILS 8 to 12
- 12 DETAILS 13 & 14
- 13 DETAILS 15 to 18, A, B, C, & D

SLIP 3  
CONTAINMENT ALTERATIONS / BOAT STORAGE  
COVER SHEET

PREPARED FOR  
CITY OF WAUKEGAN

**HEC**

Harrington Engineering & Construction, LLC

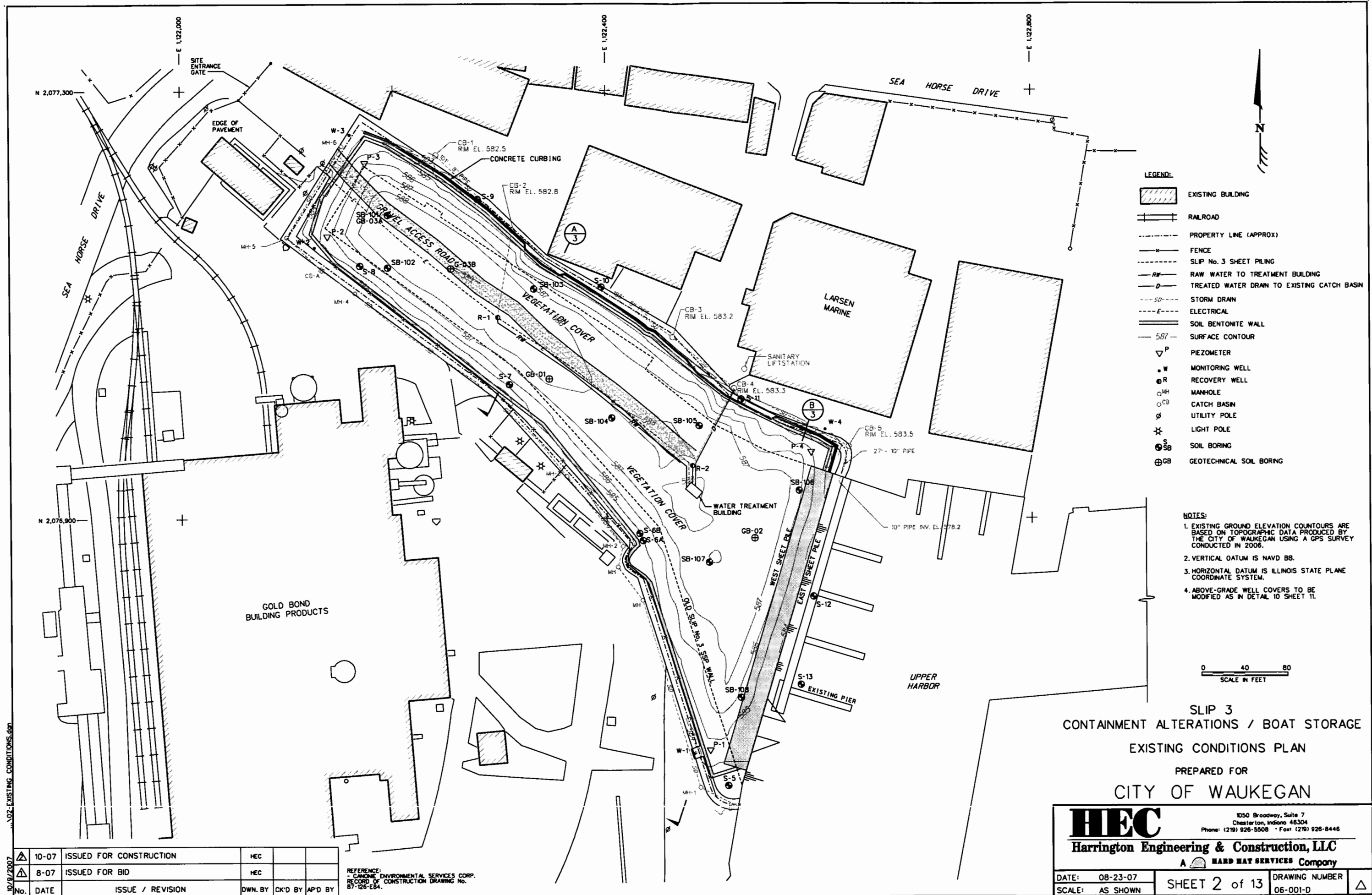
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SHEET 1 of 13

DRAWING NUMBER  
06-001-D

10-5/2007	10-07	ISSUED FOR CONSTRUCTION	HEC		
	8-07	ISSUED FOR BID	HEC		
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LEGEND:

- EXISTING BUILDING
- RAILROAD
- PROPERTY LINE (APPROX)
- FENCE
- SLIP No. 3 SHEET PILING
- RAW WATER TO TREATMENT BUILDING
- TREATED WATER DRAIN TO EXISTING CATCH BASIN
- STORM DRAIN
- ELECTRICAL
- SOIL BENTONITE WALL
- SURFACE CONTOUR
- PIEZOMETER
- MONITORING WELL
- RECOVERY WELL
- MANHOLE
- CATCH BASIN
- UTILITY POLE
- LIGHT POLE
- SOIL BORING
- GEOTECHNICAL SOIL BORING

NOTES:

- EXISTING GROUND ELEVATION COUNTOURS ARE BASED ON TOPOGRAPHIC DATA PRODUCED BY THE CITY OF WAUKEGAN USING A GPS SURVEY CONDUCTED IN 2006.
- VERTICAL DATUM IS NAVD 88.
- HORIZONTAL DATUM IS ILLINOIS STATE PLANE COORDINATE SYSTEM.
- ABOVE-GRADE WELL COVERS TO BE MODIFIED AS IN DETAIL 10 SHEET 11.

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SLIP 3  
CONTAINMENT ALTERATIONS / BOAT STORAGE  
EXISTING CONDITIONS PLAN  
PREPARED FOR  
CITY OF WAUKEGAN

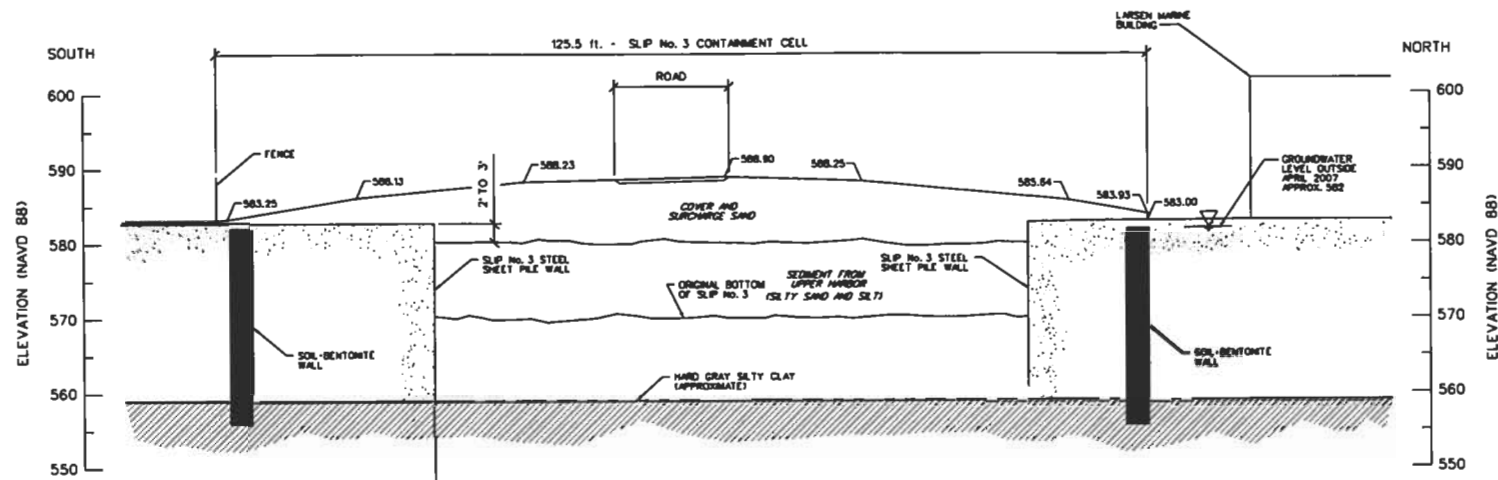
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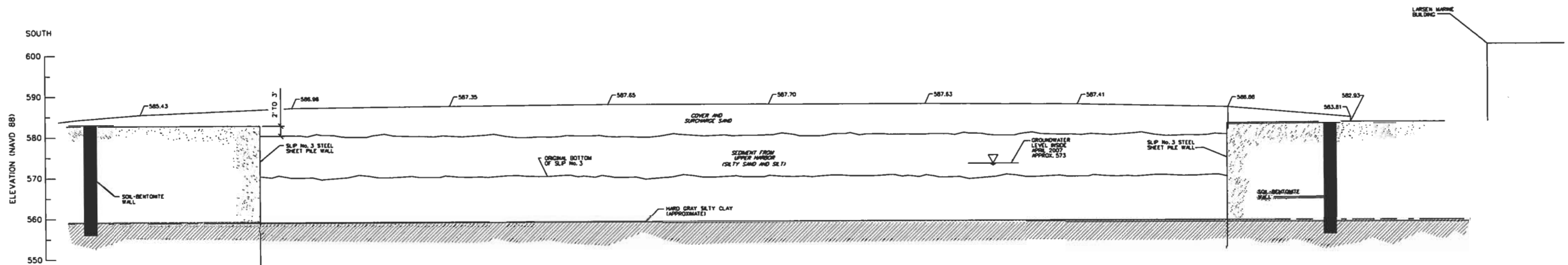
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87-126-E84.



EXISTING CROSS SECTION **A**  
2



EXISTING CROSS SECTION **B**  
2

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SLIP 3  
CONTAINMENT ALTERATIONS / BOAT STORAGE  
EXISTING CONDITIONS CROSS SECTIONS

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CITY OF WAUKEGAN

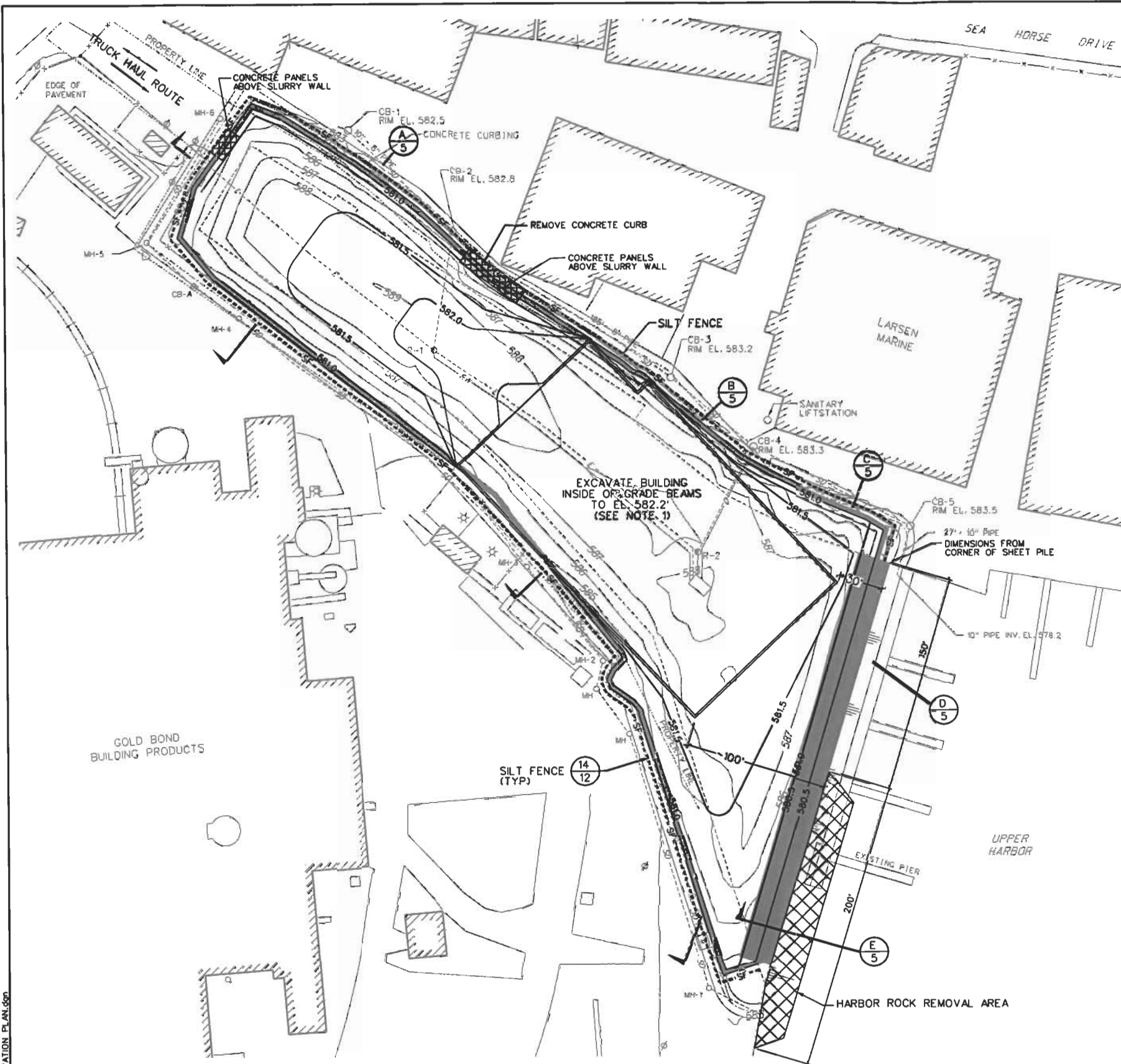
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SHEET 3 of 13  
DRAWING NUMBER 06-001-D

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# NOTES:

1. GRADE BEAMS FOR BUILDING FOUNDATION LOCATED AROUND PERIMETER OF BUILDING. SEE FOUNDATION/SLAB PLAN FOR DIMENSIONED LOCATION OF GRADE BEAMS. OVEREXCAVATE IN AREA OF GRADE BEAMS AS NECESSARY FOR FORMWORK. BOTTOM OF GRADE BEAMS AT ELEVATION 581.33. EXCAVATE 4-INCHES LOWER AT TRENCH DRAIN.
2. CONTRACTOR WILL VERIFY ALL UTILITY LOCATIONS PRIOR TO COMMENCING EXCAVATION.
3. EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSTALLED PRIOR TO BEGINNING OF ANY EXCAVATION WORK. SILT FENCES SHALL BE IN ACCORDANCE WITH ILLINOIS NRCS DETAIL 620 SHOWN ON SHEET 12.
4. ALL WORK WILL BE CONDUCTED SO AS TO PREVENT THE SPREAD OF MATERIAL EXCAVATED FROM BELOW THE EXISTING LINER. THE FOLLOWING CONSTRUCTION SEQUENCE SHALL BE ADOPTED. THIS SEQUENCE MAY BE COMPLETED IN PHASES COVERING SEVERAL PARTS OF THE WORK AREA IN TURN.
  - A) INSTALL EROSION CONTROL MEASURES
  - B) EXCAVATE COVER SOILS DOWN TO DRAINAGE LAYER / EXISTING LINER
  - C) REMOVE AND DISPOSE OF DRAINAGE LAYER/LINER
  - D) EXCAVATE PCB-CONTAINING SOIL FROM BELOW THE LINER. STOCKPILE (AS NEEDED) WITHIN THE AREA FROM WHICH THE LINER HAS BEEN REMOVED.
  - E) LOAD PCB-CONTAINING MATERIAL FOR TRANSPORT. TRUCKS SHALL NOT ENTER AREAS WHERE EXISTING LINER HAS BEEN REMOVED.
5. SOIL EXCAVATED FROM ABOVE THE EXISTING LINER MUST NOT CONTACT MATERIAL FROM BENEATH THE EXISTING LINER. SOIL FROM ABOVE THE EXISTING LINER MAY BE TEMPORARILY STOCKPILED ATOP THE EXISTING LINER AND COVER SOILS.
6. SOIL EXCAVATED FROM BELOW THE EXISTING LINER MAY NOT BE STOCKPILED ON TOP OF THE EXISTING LINER SYSTEM OR ON UNDISTURBED AREAS. MATERIAL EXCAVATED FROM BELOW THE LINER MUST BE LOADED INTO LINED TRUCKS AND TRANSPORTED TO THE APPROVED DISPOSAL LOCATION.
7. ALL STOCKPILES OF MATERIAL EXCAVATED FROM BELOW THE EXISTING LINER MUST BE COVERED NIGHTLY WITH POLYETHYLENE SHEETING. THE SHEETING MUST BE WEIGHTED TO PREVENT EXCESSIVE LIFTING DUE TO WINDS.
8. EXCAVATION GRADES SHOWN ON THIS DRAWING WERE DESIGNED TO ACHIEVE MINIMUM SLOPES OF 1% OR GREATER.
9. SILT FENCE SHALL ALSO BE INSTALLED AROUND EACH CATCH BASIN WHERE EXCAVATION EXTENDS BEYOND EXISTING SWALE.
10. SILT FENCE FABRIC SHOULD CONFORM TO THE AASHTO M288 96 SILT FENCE SPECIFICATION. THE POSTS USED TO SUPPORT THE SILT FENCE FABRIC SHOULD BE A HARDWOOD MATERIAL WITH FOLLOWING MINIMUM DIMENSIONS: 2" SQUARE (NOMINAL) BY 4' LONG. PLACE POSTS NO MORE THAN 4' APART. SILT FENCE FABRIC SHOULD BE ATTACHED TO THE WOODEN POSTS WITH STAPLES, WIRE, ZIP TIES, OR NAILS.
11. TOPSOIL AND SAND ABOVE LINER SHALL BE REMOVED AND STOCKPILED AT CITY OF WAUKEGAN PROPERTY LOCATION ON SHEET 1. TOPSOIL SHALL BE REMOVED AND STOCKPILED SEPARATELY FROM SAND LAYER.
12. LEAVE EXISTING CONCRETE PANELS OVER SLURRY WALL IN PLACE.
13. EXCAVATION OF SOIL BELOW ELEVATION 581.0' SHALL BE CONSIDERED TSCA MATERIAL AND MUST BE HANDLED, TRANSPORTED, AND DISPOSED OF AT A TSCA-APPROVED LANDFILL, IN ACCORDANCE WITH TSCA 40 CFR 761

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## SLIP 3 CONTAINMENT ALTERATIONS / BOAT STORAGE EXCAVATION PLAN

PREPARED FOR  
CITY OF WAUKEGAN

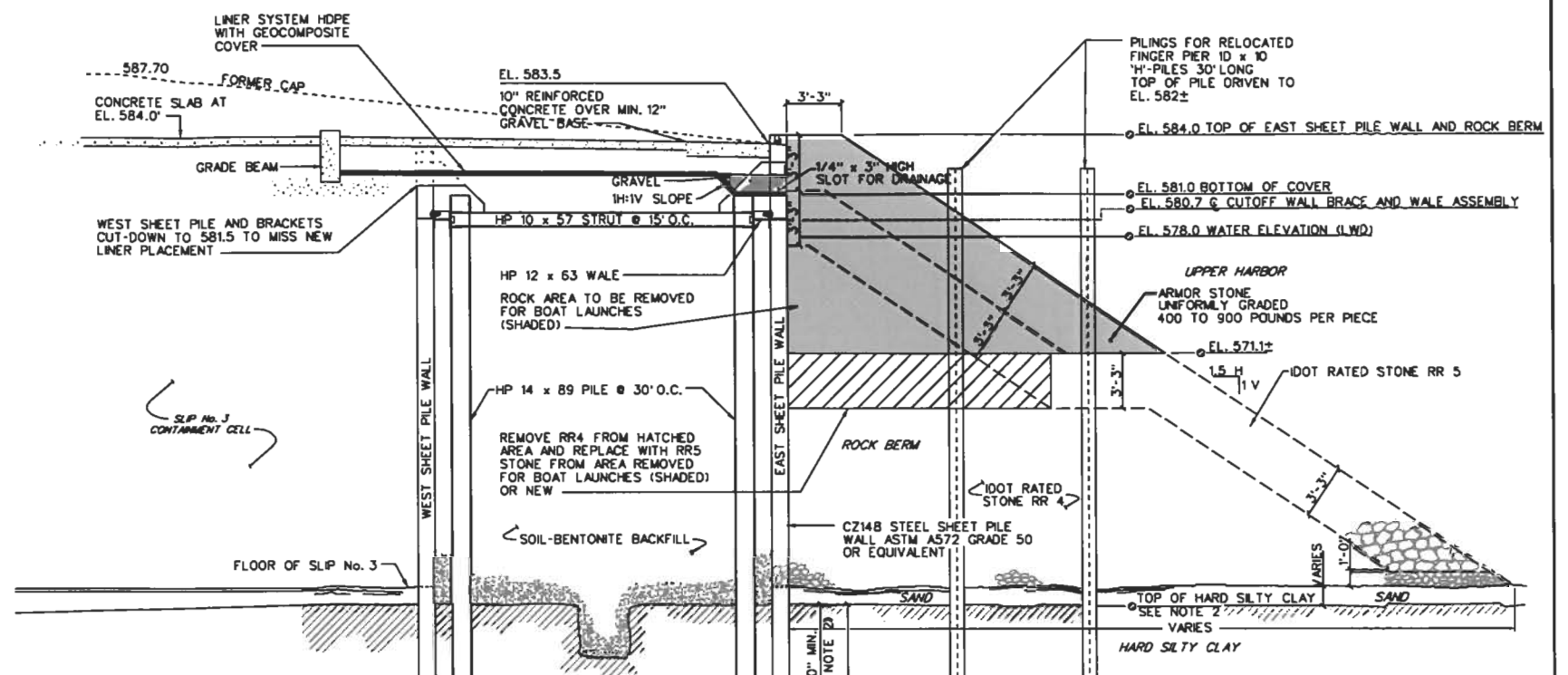
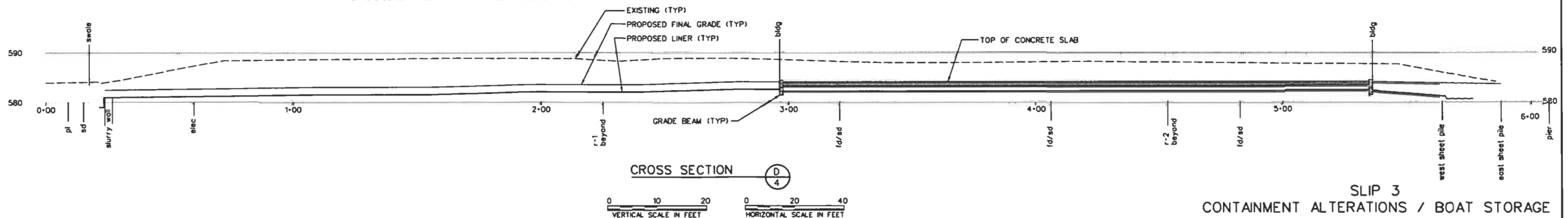
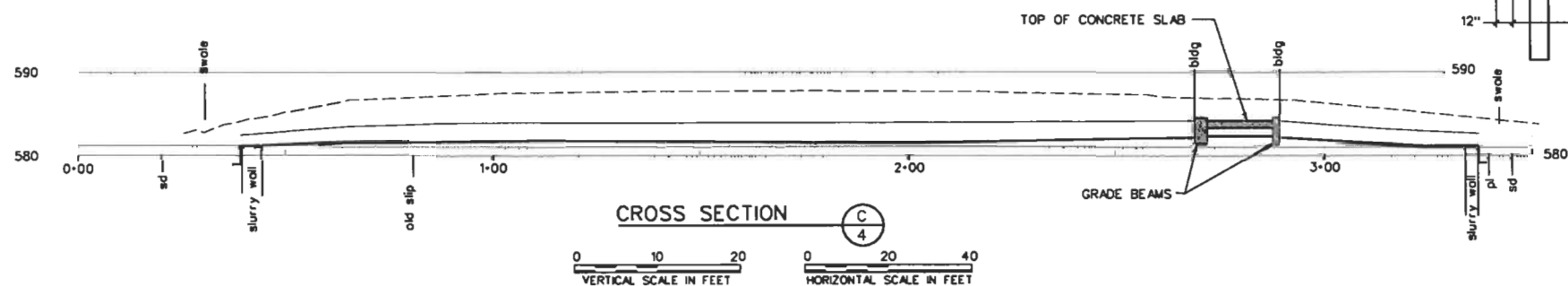
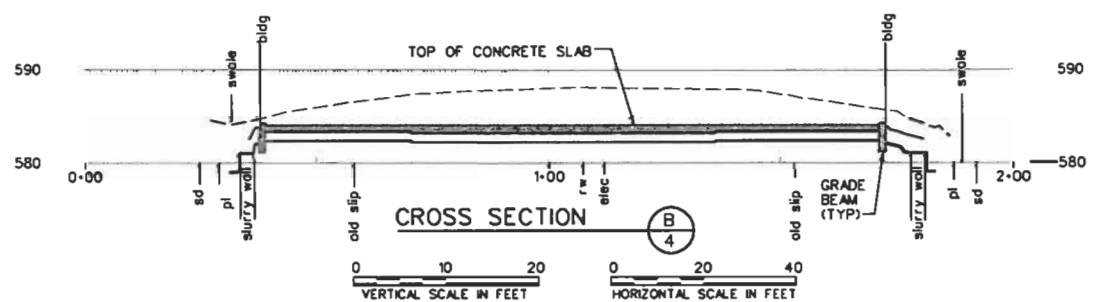
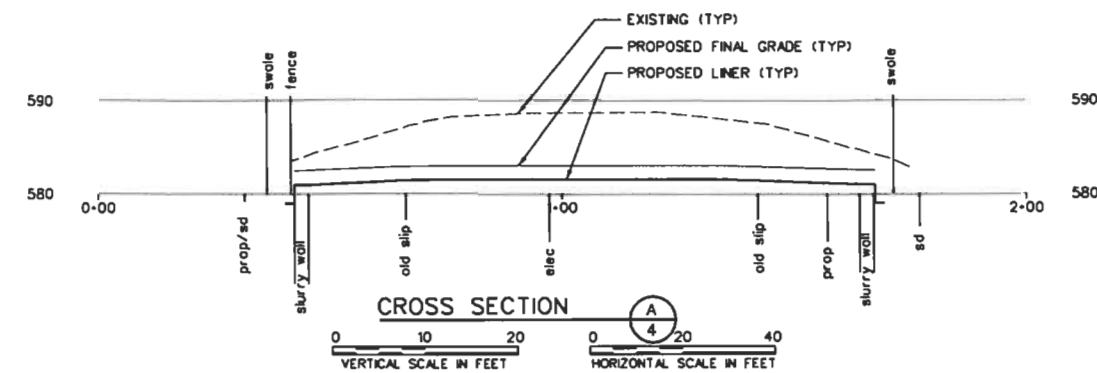
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DATE: 08-23-07 SHEET 4 of 13 DRAWING NUMBER 06-001-D  
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- NOTES:
1. ALL ELEVATIONS ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88).
  2. C2148 STEEL SHEET PILING WERE EMBEDDED 7" MINIMUM INTO THE HARD SILTY CLAY. TOP OF HARD SILTY CLAY VARIES FROM EL. 556.3 FOR MOST PORTION OF THE CUTOFF WALL TO EL. 557.6 AT SOUTH END CONNECTION.

SLIP 3  
CONTAINMENT ALTERATIONS / BOAT STORAGE  
EXCAVATION CROSS SECTIONS  
PREPARED FOR  
CITY OF WAUKEGAN

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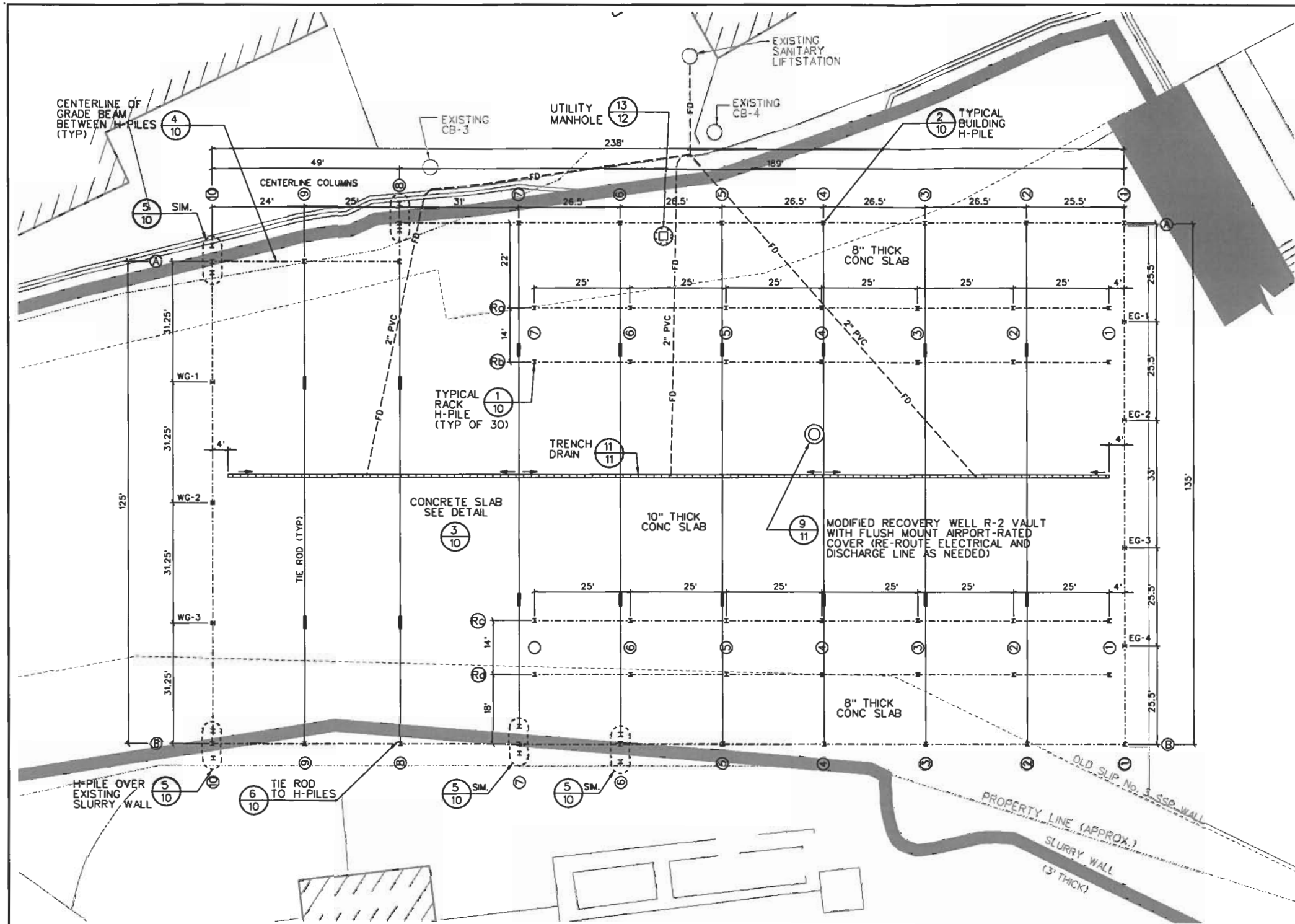
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REFERENCE:  
- CANONIC ENVIRONMENTAL SERVICES CORP.  
RECORD OF CONSTRUCTION DRAWING No.  
87-126-EB2.

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- GENERAL NOTES:
- COORDINATES ARE IN THE ILLINOIS STATE PLANE COORDINATE SYSTEM.
  - BUILDING LAYOUT AND COLUMN LOCATIONS PROVIDED BY LARSEN MARINE SERVICES.
  - ELEVATIONS ARE IN NAVD, 1988.
  - H-PILES SHALL BE DRIVEN AT LEAST 5-FOOT INTO GLACIAL TILL (DEFINED AS FIVE-FOOT OF PENETRATION AFTER NO FURTHER PENETRATION IS POSSIBLE WITH A VIBRATORY HAMMER).
  - H-PILES SHALL BE DRIVEN ON LINE WITH NO VARIATION FROM LINE OF MORE THAN 2-INCHES. ALL DIMENSIONS AND COORDINATES SHOWN ARE FROM H-PILE CENTERLINES.
  - PIPING AND ELECTRICAL CONDUITS SHALL BE INSTALLED ABOVE THE BUILDING TIE-RODS.
- STRUCTURAL NOTES:
- STRUCTURAL STEEL (H-PILES) SHALL MEET THE REQUIREMENTS OF ASTM A992.
  - WELDS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF A WS WELDING STANDARDS USING E70XX ELECTRODE.
  - STEEL STUDS SHALL COMPLY WITH ASTM A108, GRADE DESIGNATION 1010 THROUGH 1020 AND AWS D1.5.
  - STRUCTURAL BOLTS SHALL BE ASTM A325 GRADE.
  - HIGH STRENGTH STEEL TIE RODS SHALL BE GALVANIZED GRADE 75.
  - CONCRETE SHALL HAVE A 28-DAY UNCONFINED COMPRESSIVE STRENGTH OF 4000 PSI.
  - GRADE BEAM SHALL USE FIBER REINFORCED CONCRETE 1.5 LB MINIMUM / CU YDS.
  - COARSE AGGREGATE FOR CONCRETE SHALL HAVE A MAXIMUM AGGREGATE SIZE OF 1 1/2 INCH AND MEET THE REQUIREMENTS OF ASTM C33.
  - CONCRETE SLAB ON GRADE EXPOSED OUTSIDE SHALL CONTAIN 5% AIR ENTRAINMENT.
  - CONCRETE REINFORCING STEEL SHALL BE GRADE 60.
  - CHAIRS SHALL BE USED DURING SLAB-ON-GRADE POURS TO POSITION REINFORCING IN THE UPPER HALF OF THE SLAB.
  - SLAB ON GRADE SHALL BE SEPARATED FROM INTERIOR H-PILES AND GRADE BEAM BY COMPRESSIBLE MEDIUM.
  - BASE COARSE GRAVEL SHALL MEET THE GRADATION REQUIREMENTS OF ILLINOIS DOT CA-6, AND THE QUALITY REQUIREMENTS OF ILLINOIS DOT 704.1.
  - WHERE GRADE BEAM CROSSES SLURRY WALL, BACKFILL WITH SAND CONTAINING 10% BENTONITE BY WEIGHT BELOW LINER.
  - EXPANDING WATERSTOP VOLCLAY WATERSTOP-RX OR EQUAL SHALL BE INSTALLED AT COLD JOINTS IN SLAB / GRADE BEAM AND AROUND H-PILE PENETRATIONS.

SLIP 3  
CONTAINMENT ALTERATIONS / BOAT STORAGE  
FOUNDATION / SLAB PLAN  
AND H-PILE LOCATIONS  
PREPARED FOR  
CITY OF WAUKEGAN

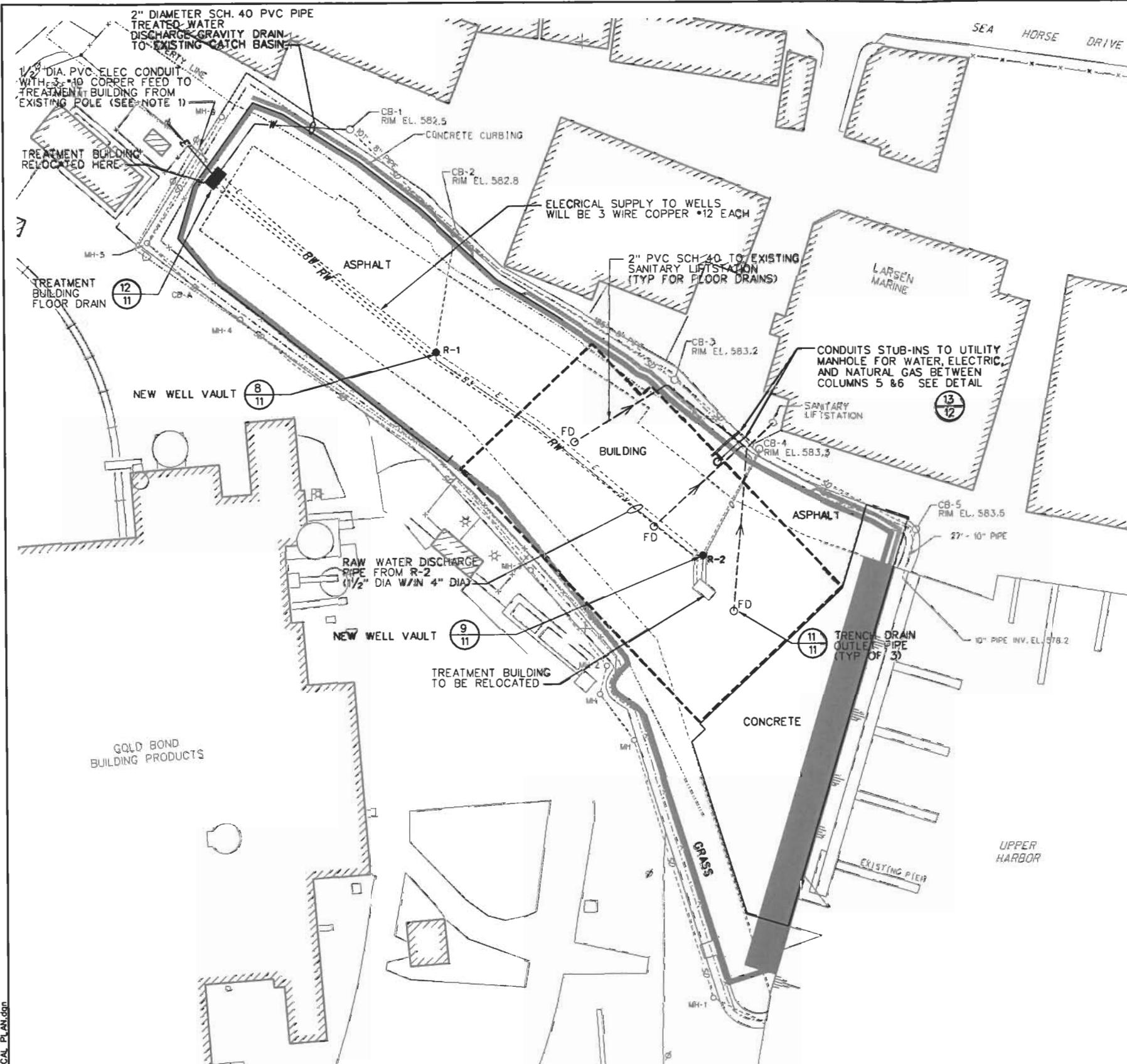
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DATE: 08-23-07  
SCALE: AS SHOWN  
SHEET 6 of 13  
DRAWING NUMBER 06-001-D

GABLE WALL H-PILE CENTER LOCATIONS			BUILDING H-PILE CENTER LOCATIONS			BUILDING H-PILE CENTER LOCATIONS (CONT.)			RACK H-PILE CENTER LOCATIONS			RACK H-PILE CENTER LOCATIONS (CONT.)		
PILE	NORTHING	EASTING	PILE	NORTHING	EASTING	PILE	NORTHING	EASTING	PILE	NORTHING	EASTING	PILE	NORTHING	EASTING
WG-1	N 2,077,072.97	E 1,122,383.06	AI-1	N 2,076,927.95	E 1,122,576.24	A2-8	N 2,077,058.71	E 1,122,439.41	Ra-1	N 2,076,915.78	E 1,122,557.47	Rc-1	N 2,076,860.26	E 1,122,498.50
WG-2	N 2,077,051.55	E 1,122,360.31	AI-2	N 2,076,946.53	E 1,122,558.77	A2-9	N 2,077,076.91	E 1,122,422.28	Ra-2	N 2,076,933.99	E 1,122,540.34	Rc-2	N 2,076,878.47	E 1,122,481.36
WG-3	N 2,077,030.13	E 1,122,337.56	AI-3	N 2,076,965.81	E 1,122,540.60	A2-10	N 2,077,094.39	E 1,122,405.83	Ra-3	N 2,076,952.20	E 1,122,523.21	Rc-3	N 2,076,896.67	E 1,122,464.23
EG-1	N 2,076,910.47	E 1,122,557.67	AI-4	N 2,076,985.11	E 1,122,522.43	B-1	N 2,076,835.42	E 1,122,477.94	Ra-4	N 2,076,970.39	E 1,122,506.07	Rc-4	N 2,076,914.87	E 1,122,447.09
EG-2	N 2,076,893.00	E 1,122,539.10	AI-5	N 2,077,004.41	E 1,122,504.27	B-2	N 2,076,853.99	E 1,122,460.46	Ra-5	N 2,076,988.60	E 1,122,488.94	Rc-5	N 2,076,933.07	E 1,122,429.95
EG-3	N 2,076,870.39	E 1,122,515.07	AI-6	N 2,077,023.71	E 1,122,486.11	B-3	N 2,076,873.29	E 1,122,442.30	Ra-6	N 2,077,006.81	E 1,122,471.80	Rc-6	N 2,076,951.28	E 1,122,412.82
EG-4	N 2,076,852.90	E 1,122,496.51	AI-7	N 2,077,042.58	E 1,122,467.94	B-4	N 2,076,892.58	E 1,122,424.14	Ra-7	N 2,077,025.91	E 1,122,454.66	Rc-7	N 2,076,969.48	E 1,122,395.68
			AI-8	N 2,077,065.57	E 1,122,446.69	B-5	N 2,076,911.88	E 1,122,405.97	Rb-1	N 2,076,906.19	E 1,122,547.28	Rd-1	N 2,076,850.67	E 1,122,488.31
						B-6	N 2,076,931.17	E 1,122,387.80	Rb-2	N 2,076,924.39	E 1,122,530.15	Rd-2	N 2,076,868.87	E 1,122,471.17
						B-7	N 2,076,950.47	E 1,122,369.64	Rb-3	N 2,076,942.60	E 1,122,513.01	Rd-3	N 2,076,887.08	E 1,122,454.03
						B-8	N 2,076,973.04	E 1,122,348.39	Rb-4	N 2,076,960.80	E 1,122,495.88	Rd-4	N 2,076,905.28	E 1,122,436.90
						B-9	N 2,076,991.25	E 1,122,331.26	Rb-5	N 2,076,979.00	E 1,122,478.74	Rd-5	N 2,076,923.48	E 1,122,419.76
						B-10	N 2,077,008.72	E 1,122,314.81	Rb-6	N 2,076,997.21	E 1,122,461.61	Rd-6	N 2,076,941.68	E 1,122,402.62
									Rb-7	N 2,077,015.41	E 1,122,444.47	Rd-7	N 2,076,959.88	E 1,122,385.49

10-07	ISSUED FOR CONSTRUCTION	HEC		
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# LEGEND:

- FD FLOOR DRAIN
- R-2 RECOVERY WELL AND VAULT
- E--- 2" PVC SCH 40 ELECTRICAL CONDUIT WITH 3\*6 WIRE FROM TREATMENT PLANT TO EACH WELL (ABOVE NEW LINER)
- RW--- PIPE 1/2" DIA. HDPE LINE BUTT WELDED ENCLOSED IN A 4" PVC SCH 40 CONDUIT CARRIER PIPE RUNNING TO TREATMENT BUILDING (ABOVE NEW LINER)
- W--- 2" HDPE TREATED WATER DISCHARGE PIPE FROM RELOCATED TREATMENT BUILDING TO EXISTING CATCH BASIN (CB-1) GRAVITY DRAIN

# NOTES:

1. MAINTAIN EXISTING POWER FED FROM POLE WITH NEW UNDERGROUND FEED TO RELOCATED TREATMENT BUILDING.
2. HDPE PIPE SHALL BE SDR 17.
3. BUILDING DOWNSPOUTS TO BE INSTALLED NO MORE THAN 18" BELOW GRADE AND UNDER SUPERVISION OF THE CITY OF WAUKEGAN.

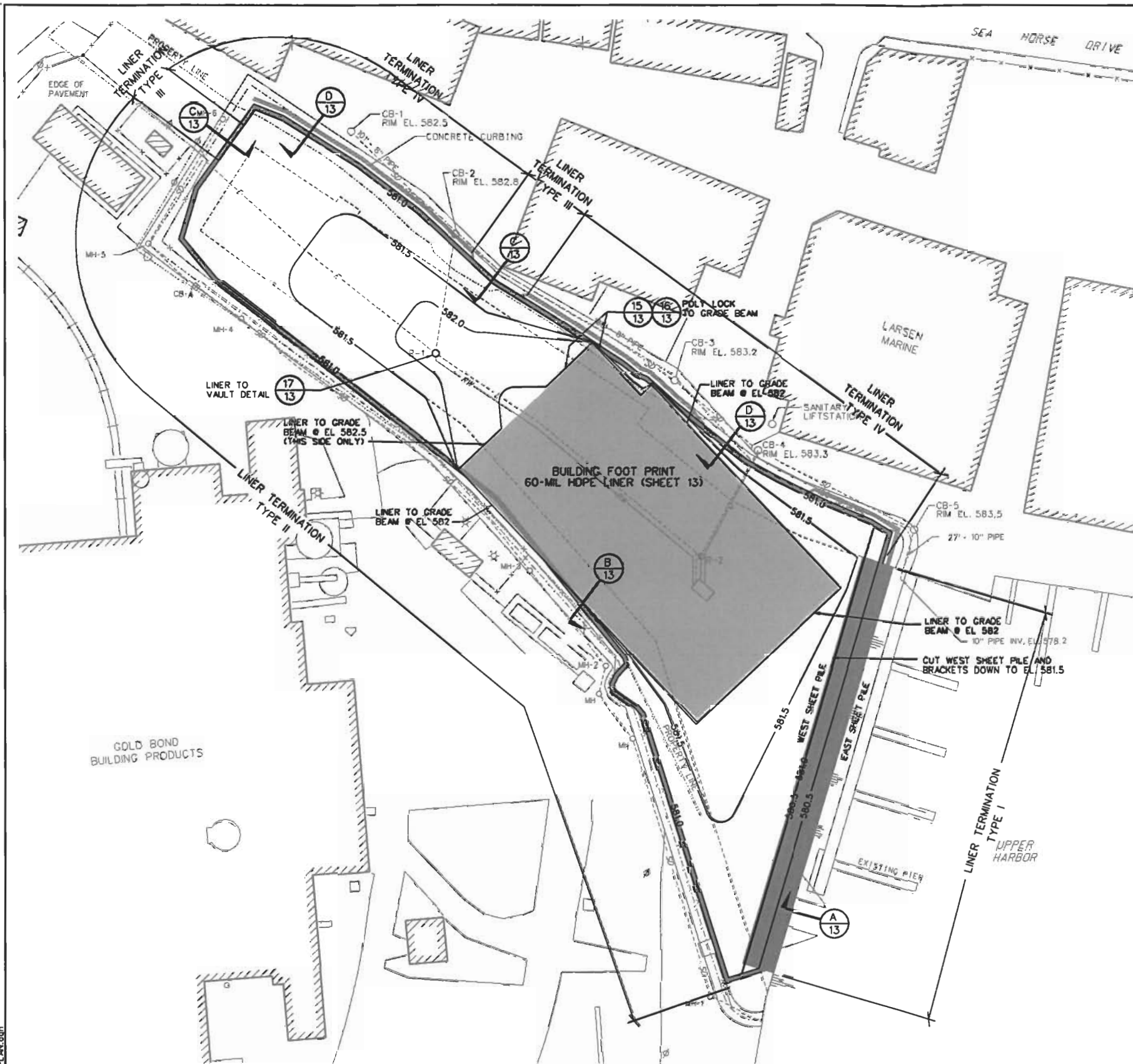
SLIP 3  
CONTAINMENT ALTERATIONS / BOAT STORAGE  
MECHANICAL AND ELECTRICAL PLAN

PREPARED FOR  
CITY OF WAUKEGAN

**HEC**  
Harrington Engineering & Construction, LLC  
A HARD HAT SERVICES Company

DATE: 08-23-07  
SCALE: AS SHOWN  
SHEET 7 of 13  
DRAWING NUMBER  
06-001-D

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LEGEND:  
 SLURRY WALL

- NOTE:
1. LINER MATERIAL TO BE SMOOTH 60-MIL HDPE.
  2. LINER WITHIN BUILDING FOOTPRINT FASTENED TO GRADE BEAMS AS SHOWN IN DETAIL 15, SHEET 17.
  3. REMOVE ROCKS AND OTHER OBJECTS FROM SURFACE PRIOR TO PLACING LINER TO MINIMIZE RISK OF LINER PUNCTURE.
  4. LINER INSIDE BUILDING PLACED AT ELEVATION 582.2 AND SEPARATED FROM LINER OUTSIDE BUILDING BY GRADE BEAM.

0 40 80  
 SCALE IN FEET

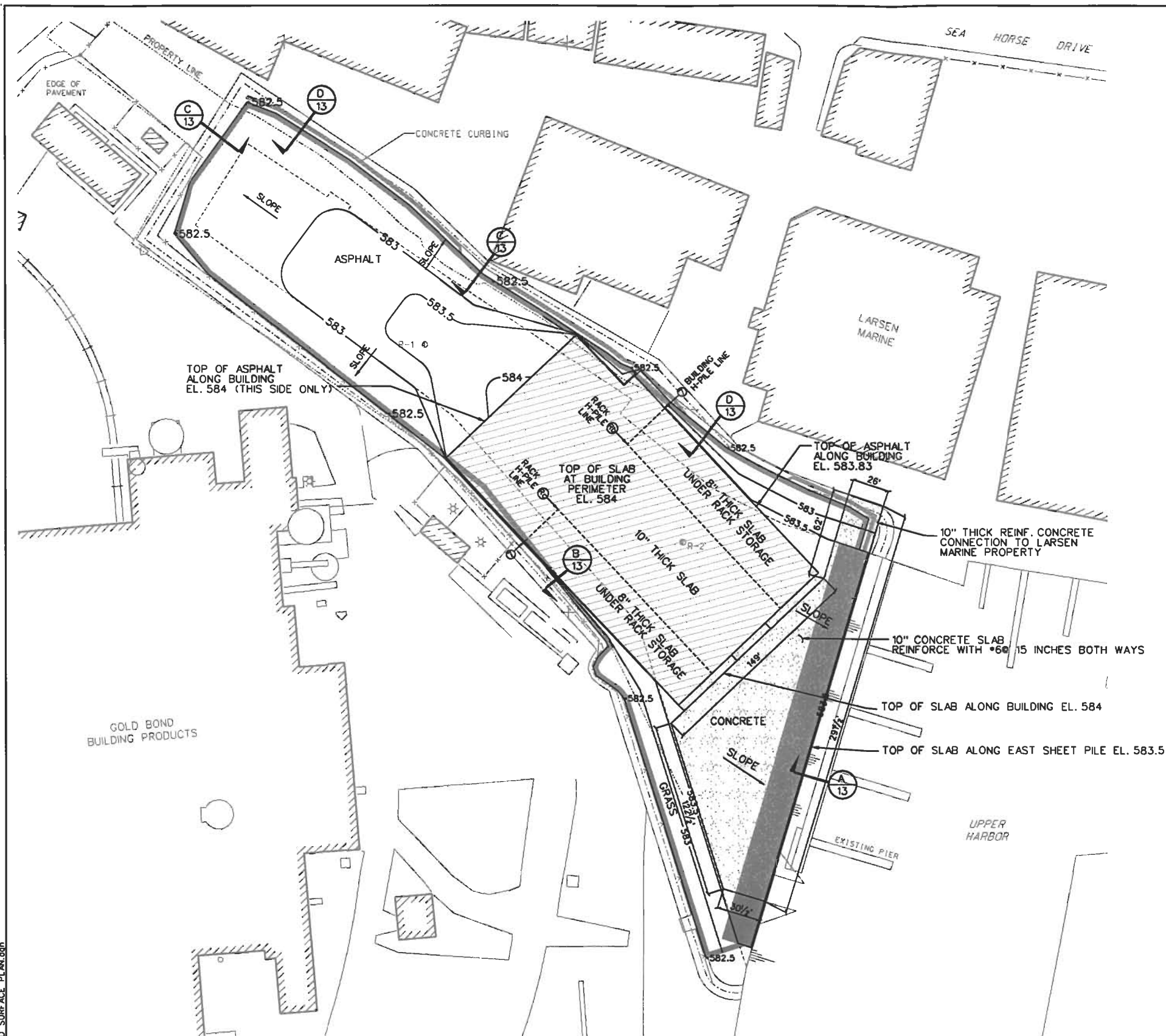
SLIP 3  
 CONTAINMENT ALTERATIONS / BOAT STORAGE  
 TOP OF LINER PLAN

PREPARED FOR  
 CITY OF WAUKEGAN

<b>HEC</b> Harrington Engineering & Construction, LLC A HARD HAT SERVICES Company		1050 Broadway, Suite 7 Chesterton, Indiana 46304 Phone: (219) 926-5508 • Fax: (219) 926-8446	
DATE:	08-23-07	SHEET 8 of 13	DRAWING NUMBER
SCALE:	AS SHOWN		06-001-D

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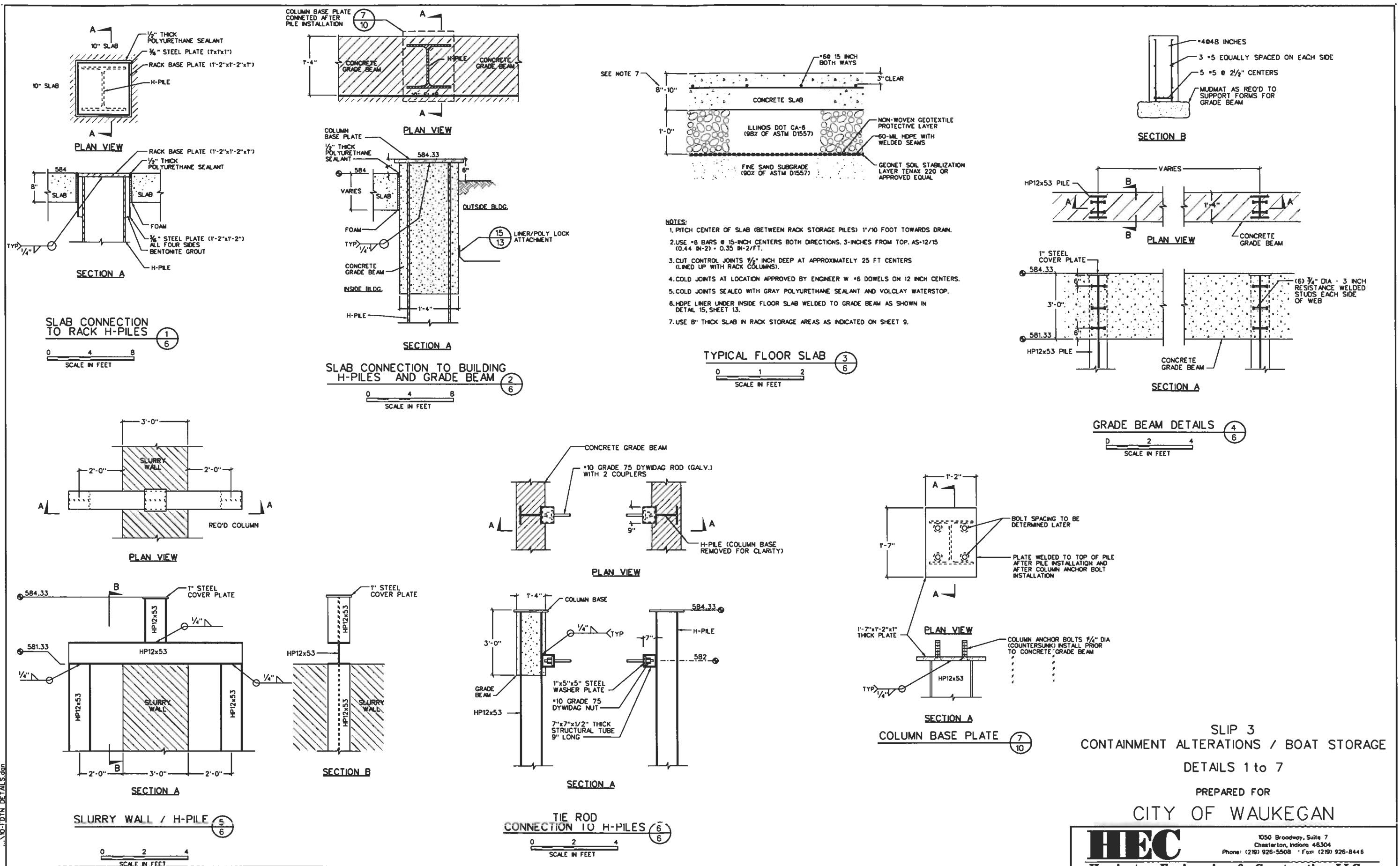


SLIP 3  
CONTAINMENT ALTERATIONS / BOAT STORAGE  
FINISHED SURFACE PLAN  
PREPARED FOR  
CITY OF WAUKEGAN

<b>HEC</b> Harrington Engineering & Construction, LLC A HARD HAT SERVICES Company		1050 Broadway, Suite 7 Chester, Indiana 46304 Phone: (219) 926-5508 Fax: (219) 926-8446	
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No.	DATE	ISSUE / REVISION	DWN. BY	CK'D BY

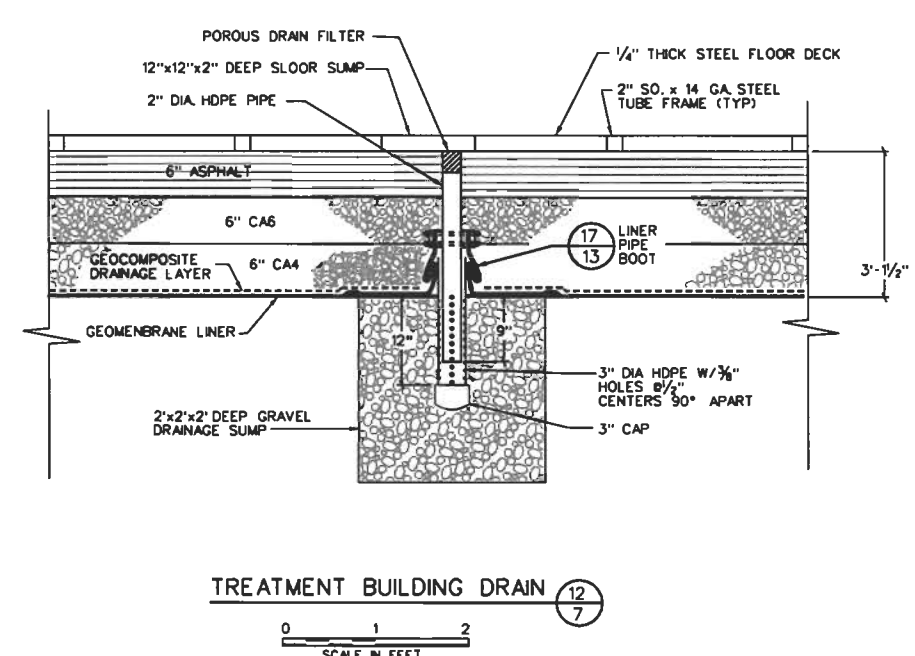
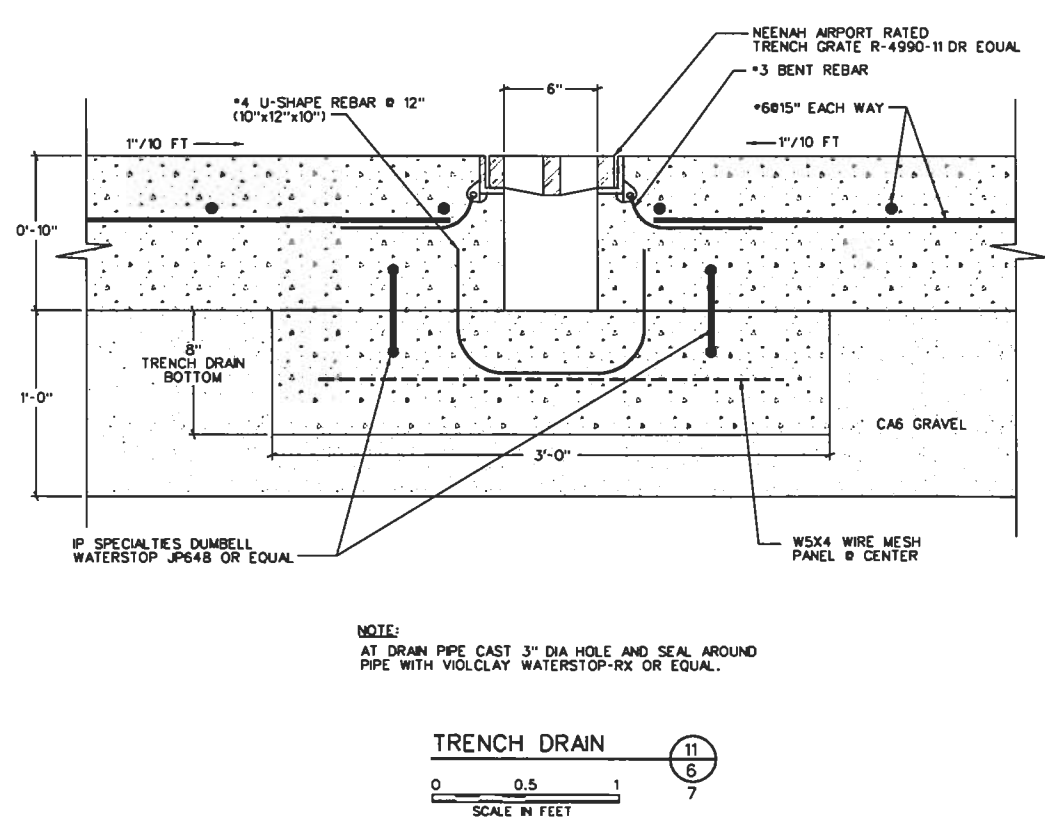
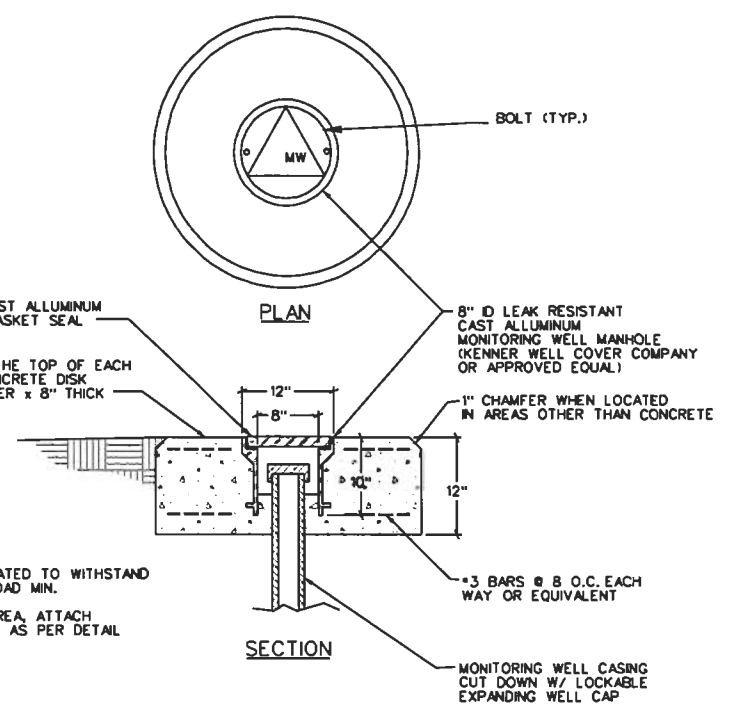
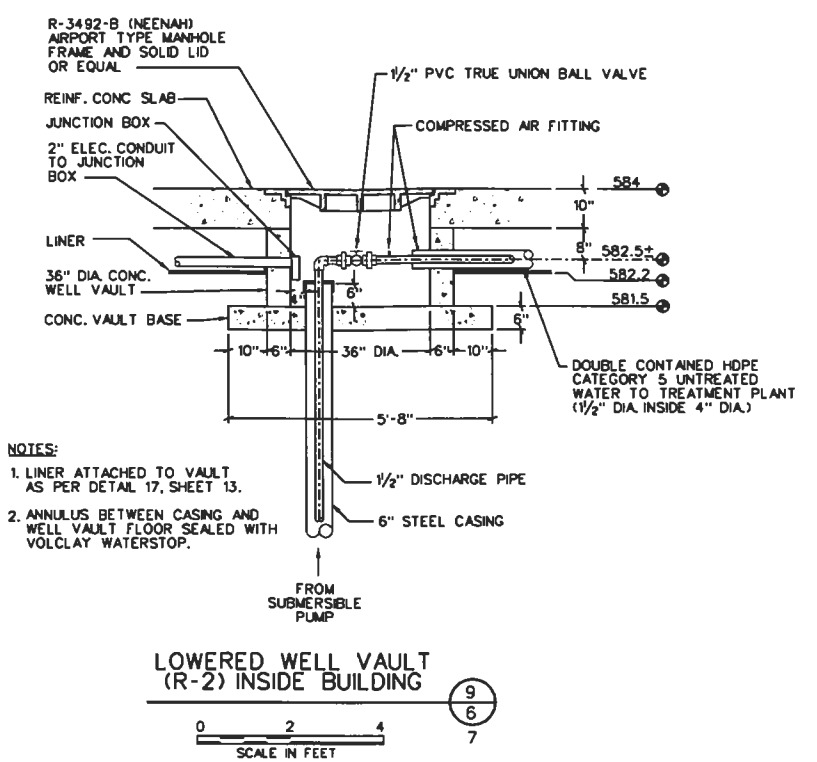
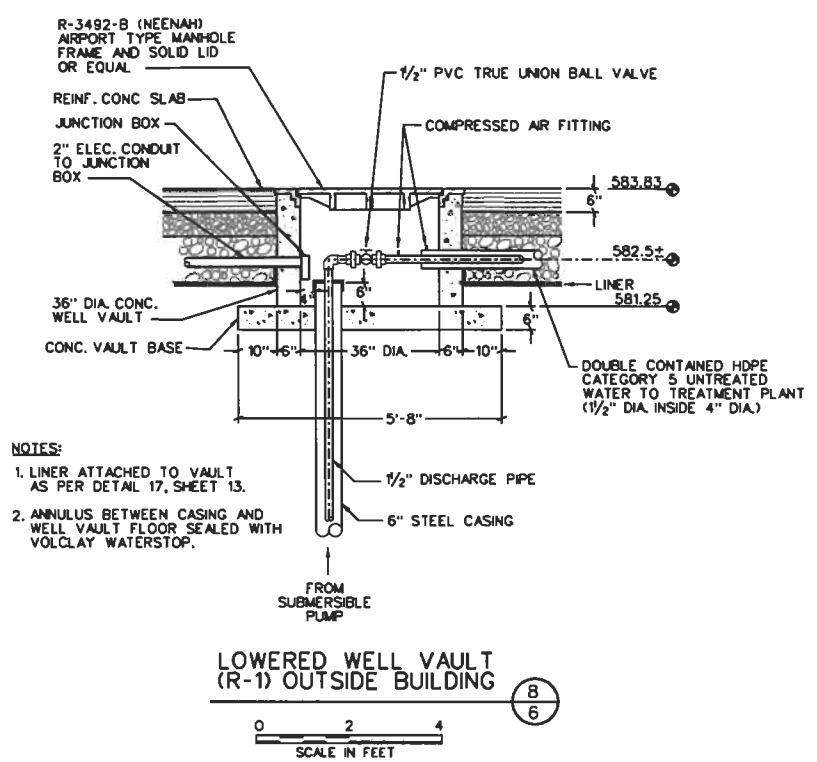


SLIP 3  
CONTAINMENT ALTERATIONS / BOAT STORAGE  
DETAILS 1 to 7  
PREPARED FOR  
CITY OF WAUKEGAN

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...10-1 DTN DETAILS.dgn

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SLIP 3  
CONTAINMENT ALTERATIONS / BOAT STORAGE  
DETAILS 8 to 12  
PREPARED FOR  
CITY OF WAUKEGAN

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Harrington Engineering & Construction, LLC  
A HARD HAT SERVICES Company

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Chesterton, Indiana 46304  
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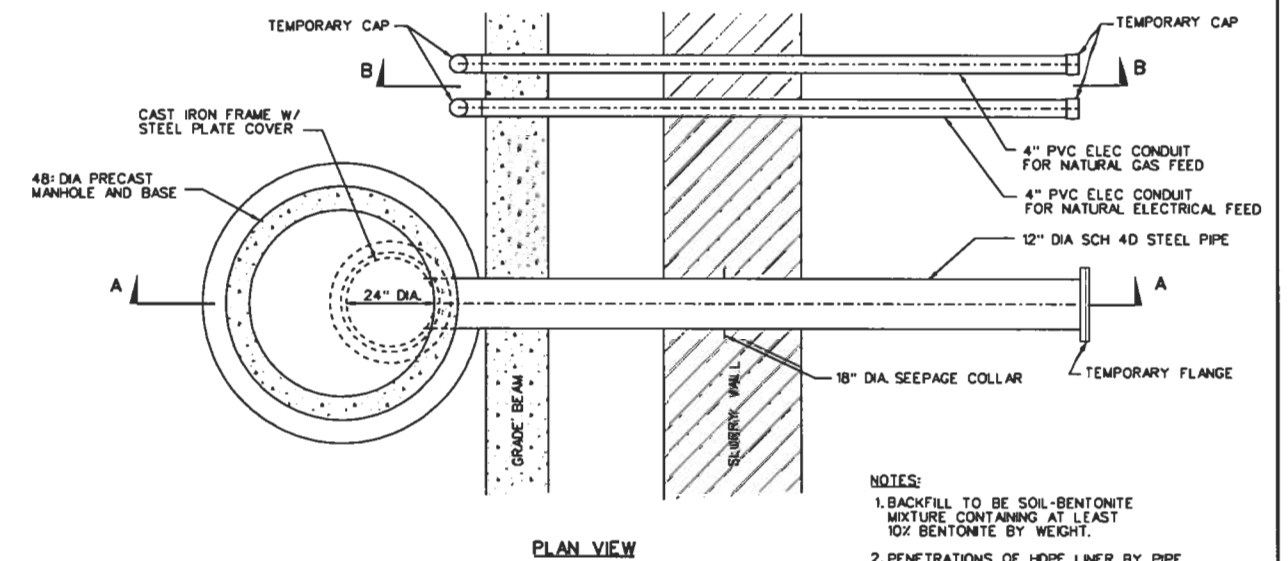
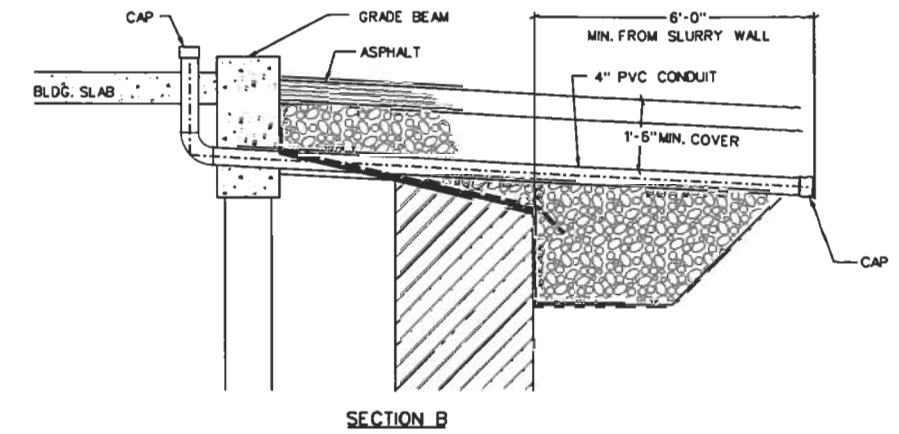
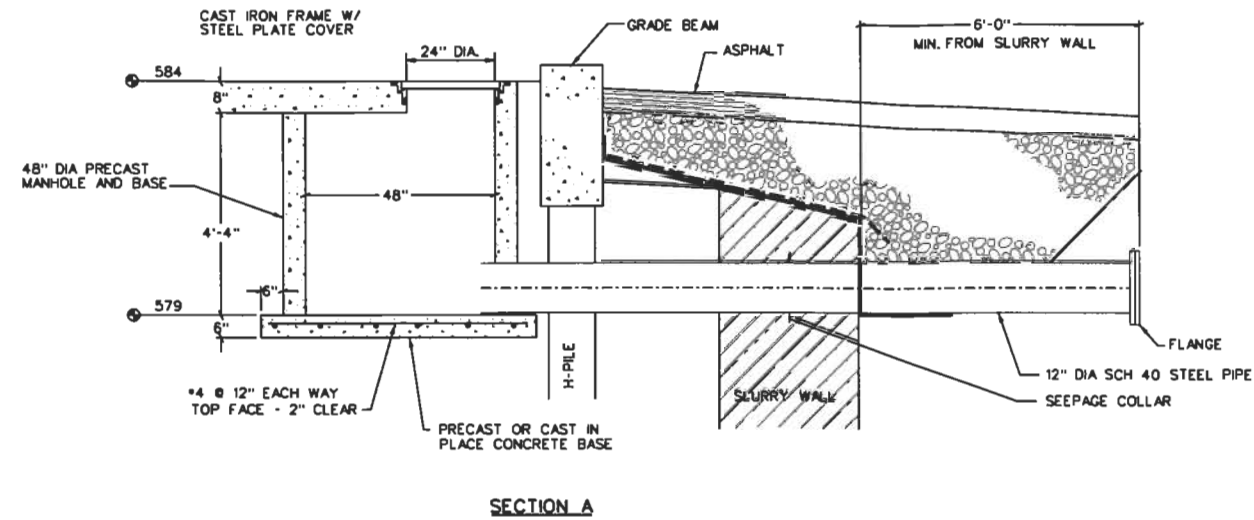
SHEET 11 of 13

DRAWING NUMBER  
06-001-D

10/5/2007  
...11-FDIN DETAILS.dgn

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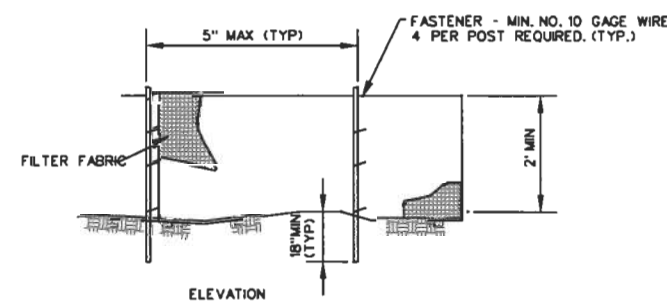
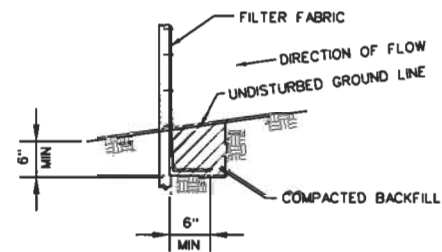
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- NOTES:
1. BACKFILL TO BE SOIL-BENTONITE MIXTURE CONTAINING AT LEAST 10% BENTONITE BY WEIGHT.
  2. PENETRATIONS OF HDPE LINER BY PIPE AND CONDUIT SHALL BE AS SHOWN IN DETAIL 17, SHEET 13

UTILITY VAULT  
NOT TO SCALE

13  
6  
7



- NOTES:
1. TEMPORARY SEDIMENT FENCE SHALL BE INSTALLED PRIOR TO ANY GRADING WORK IN THE AREA TO BE PROTECTED. THEY SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD AND REMOVED IN CONJUNCTION WITH THE FINAL GRADING AND SITE STABILIZATION.
  2. FILTER FABRIC SHALL MEET THE REQUIREMENTS OF CLASS L WITH EQUIVALENT OPENING SIZE OF AT LEAST 30 FOR NONWOVEN AND 50 FOR WOVEN.
  3. FENCE POSTS SHALL BE EITHER WOOD POST WITH A MINIMUM CROSS-SECTIONAL AREA OF 3.0 SQ. IN. OR A STANDARD STEEL POST.

SILT FENCE  
NOT TO SCALE

14  
4

SLIP 3  
CONTAINMENT ALTERATIONS / BOAT STORAGE  
DETAILS 13 & 14

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CITY OF WAUKEGAN

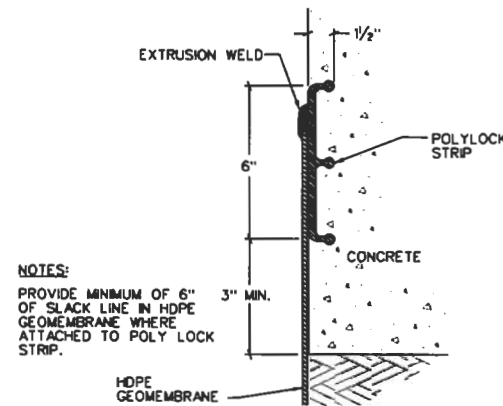
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A HARD HAT SERVICES Company

DATE: 08-23-07  
SCALE: AS SHOWN  
SHEET 12 of 13  
DRAWING NUMBER: 06-001-D

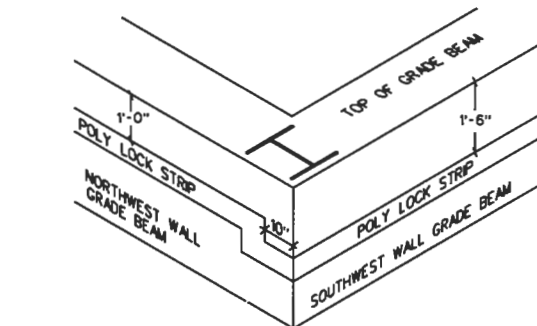
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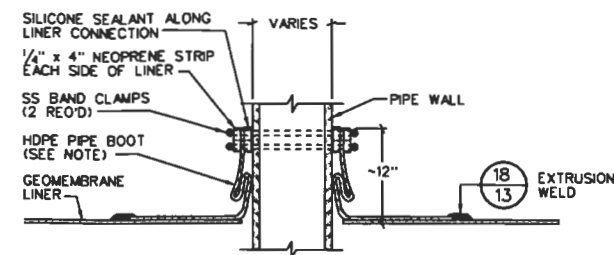
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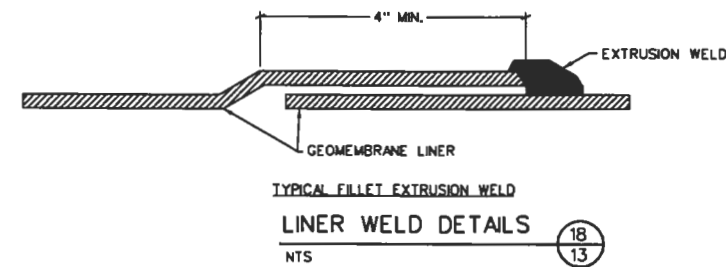
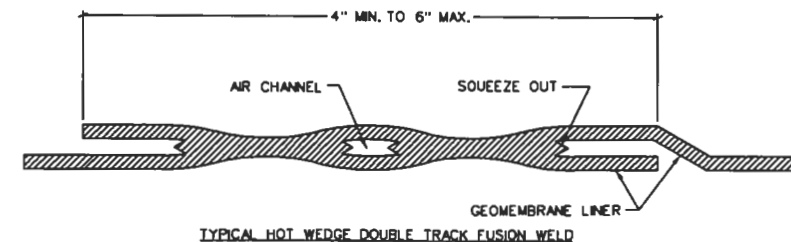
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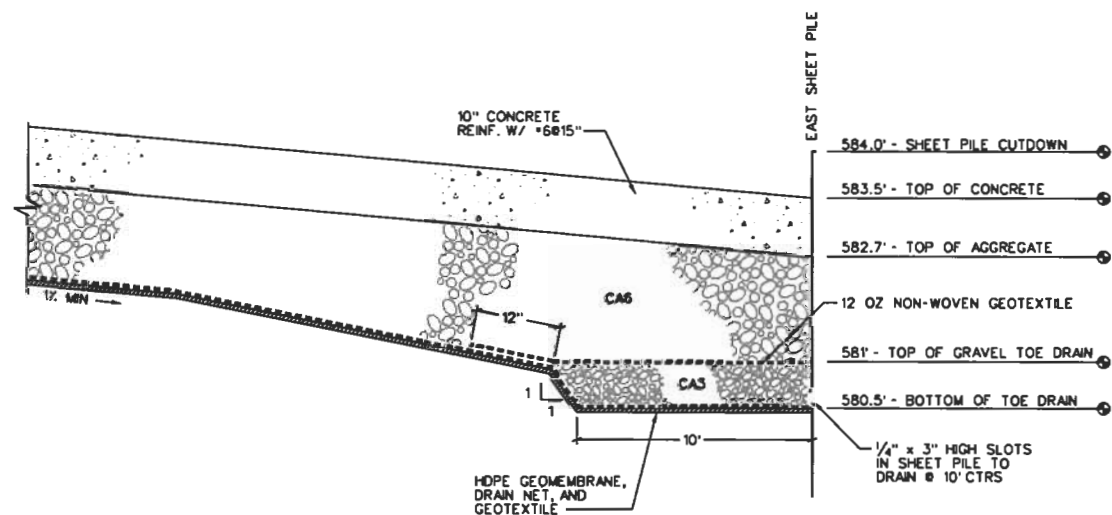
POLY LOCK LOCATION ON BEAM  
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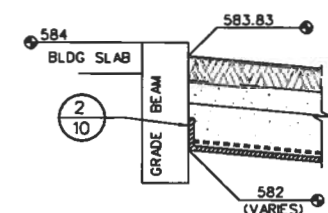
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CIRCULAR PENETRATIONS  
NTS



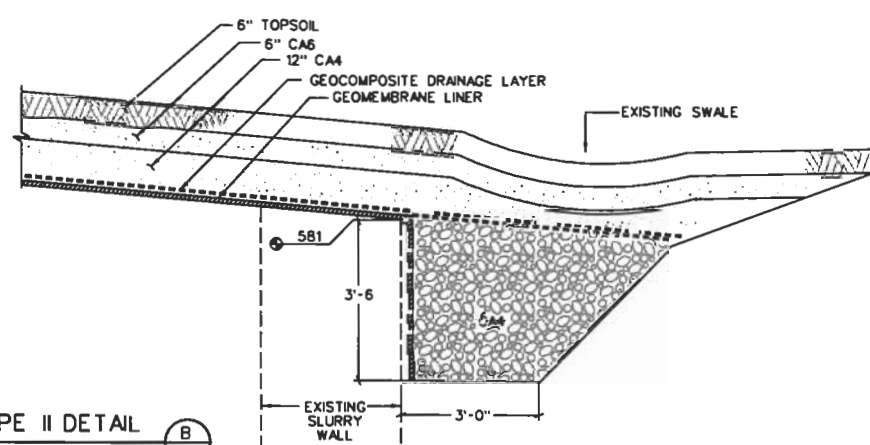
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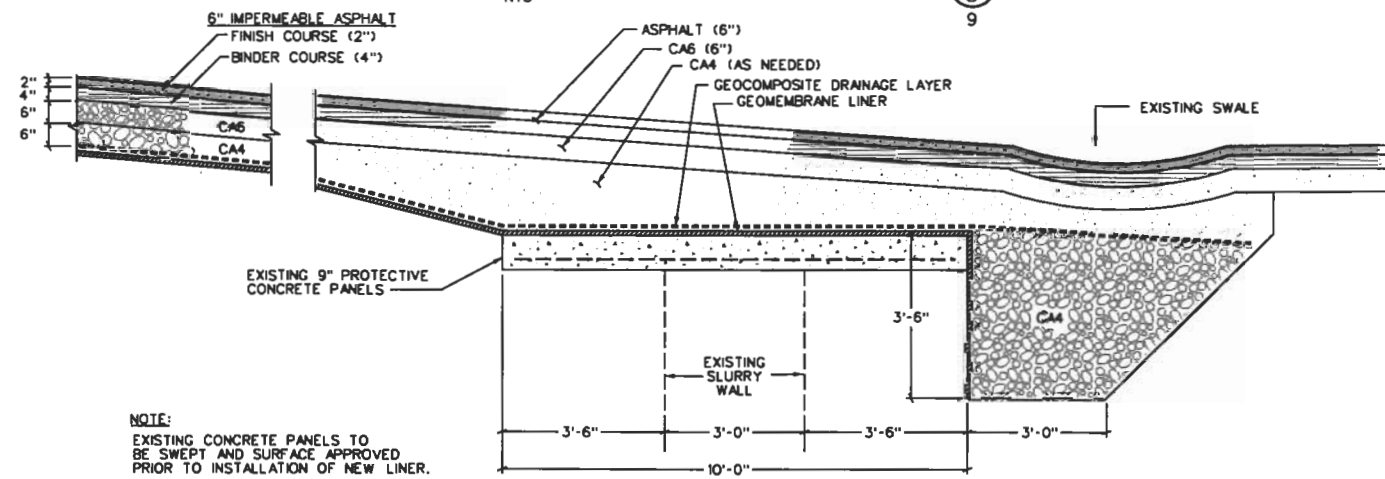
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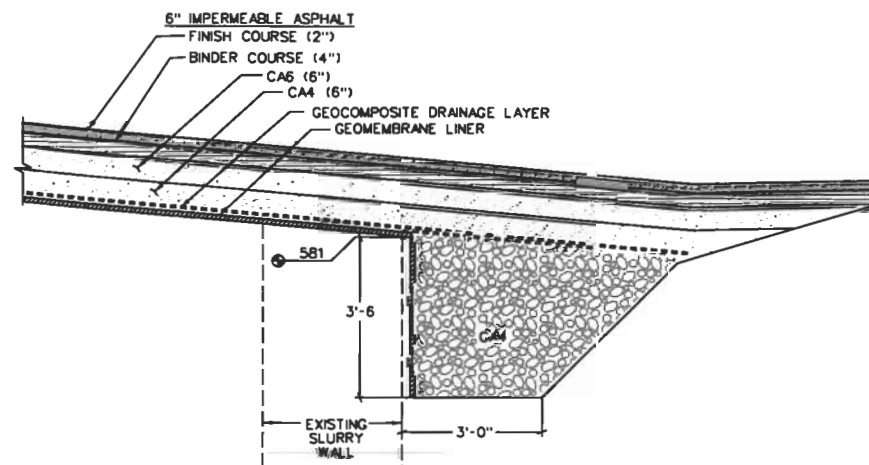
LINER TERMINATION TYPE II DETAIL  
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- GENERAL NOTES:
- THE DRAINAGE LAYER CONSIST OF A GEONET DRAINAGE LAYER WITH A GEOTEXTILE HEAT BONDED TO THE UPPER SIDE. THE GEONET SHALL MEET THE FOLLOWING SPECIFICATIONS:  
A) BI-PLANAR STRUCTURE  
B) MINIMUM TRANSMISSIVITY 9.5 GAL/MIN/FT  
C) THICKNESS: 5MM  
D) MINIMUM TENSILE STRENGTH: 45 LB/IN
  - THE GEOTEXTILE, PRIOR TO ADHESION, SHALL MEET THE FOLLOWING SPECIFICATIONS:  
A) MINIMUM MASS PER AREA: 12 OZ./SQUARE YARD  
B) MINIMUM GRAB TENSILE: 170 LBS.  
C) MINIMUM PUNCTURE STRENGTH: 90 LBS.
  - THE GEOCOMPOSITE SHALL MEET THE FOLLOWING SPECIFICATIONS:  
A) MINIMUM MASS PER AREA: 6 OZ./SQUARE YARD
  - GEOMEMBRANE LINER SHALL BE 60-MIL HDPE MEETING THE FOLLOWING SPECS:



LINER TERMINATION TYPE III DETAIL  
NTS



LINER TERMINATION TYPE IV DETAIL  
NTS

SLIP 3  
CONTAINMENT ALTERATIONS / BOAT STORAGE  
DETAILS 15 to 18, A, B, C, & D  
PREPARED FOR  
CITY OF WAUKEGAN

**HEC**  
Harrington Engineering & Construction, LLC  
A HARD HAT SERVICES Company

1050 Broadway, Suite 7  
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Phone: (219) 926-5508 • Fax: (219) 926-8445

DATE: 08-23-07  
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SHEET 13 of 13  
DRAWING NUMBER  
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10-07	ISSUED FOR CONSTRUCTION	HEC		
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10/5/2007 13-LINER DETAILS.dgn

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